

We claim:

1. A process for preparing substantially pure 3-aminomethyl-3,5,5-trimethylcyclohexylamine (isophoronediamine, IPDA) having a cis/trans isomer ratio of at least 73/27, comprising the following steps:
 - a) providing crude IPDA having a cis/trans isomer ratio of $< 73/27$;
 - b) purifying and separating the crude IPDA into a fraction having a cis/trans isomer ratio of at least 73/27 and a fraction having a cis/trans isomer ratio of less than 63/37;
 - c) isomerizing the fraction of substantially pure IPDA having a cis/trans isomer ratio of less than 63/37 obtained in step b) to IPDA having a cis/trans isomer ratio in the range from 63/37 to 66/34 in the presence of H_2 , NH_3 and a hydrogenation catalyst and recycling it into step a) of the process.
2. A process as claimed in claim 1, wherein the crude IPDA is purified and separated in step b) of the process by distillation.
3. A process as claimed in claim 2, wherein step b) of the process is carried out in two spatially separated distillation columns.
4. A process as claimed in claim 3, wherein at least one of the distillation columns is a dividing wall column.
5. A process as claimed in any of claims 1 to 4, wherein the IPDA is separated in step b) of the process into a fraction having a cis/trans isomer ratio in the range from 73/27 to 76/24 and a fraction having a cis/trans isomer ratio of less than 63/37.
6. A process as claimed in any of claims 1 to 5, wherein crude IPDA having a cis/trans isomer ratio of $\leq 70/30$ is provided in step a) of the process.
7. A process as claimed in any of claims 1 to 6, wherein the hydrogenation catalyst used in step c) of the process is a catalyst comprising at least one transition metal selected from the group of copper, silver, gold, iron, cobalt, nickel, rhenium,

ruthenium, rhodium, palladium, osmium, iridium, platinum, chromium, molybdenum and tungsten, preferably selected from the group of copper, silver, iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium and platinum, more preferably selected from the group of copper, cobalt, nickel, ruthenium, iridium, rhodium, palladium and platinum.

8. A process for preparing 3-aminomethyl-3,5,5-trimethylcyclohexylamine (isophoronediamine, IPDA) having a cis/trans isomer ratio in the range from 63/37 to 66/34 by reacting IPDA having any desired cis/trans isomer ratio with H_2 and NH_3 over a hydrogenation catalyst.

9. A process as claimed in claim 8, wherein the hydrogenation catalyst used is a catalyst comprising at least one transition metal selected from the group of copper, silver, gold, iron, cobalt, nickel, rhenium, ruthenium, rhodium, palladium, osmium, iridium, platinum, chromium, molybdenum and tungsten, preferably selected from the group of copper, silver, iron, cobalt, nickel, ruthenium, rhodium, palladium, osmium, iridium and platinum, more preferably selected from the group of copper, cobalt, nickel, ruthenium, iridium, rhodium, palladium and platinum.

10. A process as claimed in claim 8 or 9, wherein the reaction is carried out at a temperature of from 70 to 200°C, preferably from 80 to 150°C, more preferably from 90 to 130°C, and/or at a pressure of from 1 to 300 bar, preferably from 10 to 250 bar, more preferably from 100 to 240 bar.